

CLAIMS

1. A cellulose acylate film, which comprises a cellulose acylate having a glucose unit of cellulose, wherein a hydroxyl group of the glucose unit is substituted by an acyl group having 2 or more carbon atoms,

wherein

DS2, DS3 and DS6 respectively representing degrees of substitution of the hydroxyl groups at 2, 3 and 6 positions of the glucose unit by the acyl group satisfy formulae (I) and (II), and

Re(λ) and Rth(λ) defined by formulae (III) and (IV) satisfy formulae (V) and (VI):

$$(I) \quad 2.00 \leq DS2 + DS3 + DS6 \leq 3.00$$

$$(II) \quad DS6 / (DS2 + DS3 + DS6) \geq 0.315$$

$$(III) \quad Re(\lambda) = (n_x - n_y) \times d$$

$$(IV) \quad Rth(\lambda) = \{(n_x + n_y) / 2 - n_z\} \times d$$

$$(V) \quad 46 \leq Re(630) \leq 200$$

$$(VI) \quad 70 \leq Rth(630) \leq 350$$

wherein Re(λ) is a retardation value by nm in a film plane of the cellulose acylate film with respect to a light having a wavelength of λ nm;

Rth(λ) is a retardation value by nm in a direction perpendicular to the film plane of the cellulose acylate film with respect to the light having the wavelength of λ nm;

n_x is a refractive index in a slow axis direction in the film plane;

n_y is a refractive index in a fast axis direction in the film plane;

n_z is a refractive index in the direction perpendicular the film plane; and

d is a thickness of the cellulose acylate film.

2. The cellulose acylate film according to claim 1, wherein Rth(λ) satisfies formula (VII):

$$(VII) \quad 160 \leq Rth(630) \leq 350$$

3. The cellulose acylate film according to claim 1 or 2, wherein the acyl group is an acetyl group.

4. The cellulose acylate film according to any one of claims 1 to 3, which comprises a retardation-producing agent comprising one of a rod-like compound and a discotic compound.

5. The cellulose acylate film according to any one of claims 1 to 4, which comprises at least one of a plasticizer, an ultraviolet absorber and a peeling accelerator.

6. The cellulose acylate film according to any one of claims 1 to 5, which has a thickness of from 40 to 110 μm .

7. The cellulose acylate film according to any one of claims 1 to 6, which has an additive amount of from 10 to 30% by weight, the additive amount being based on a weight of the cellulose acylate.

8. The cellulose acylate film according to any one of claims 1 to 7, which has ΔRe of 12 nm or less and ΔRth of 32 nm or less,

wherein ΔRe represents a difference between a Re value at 25 °C and 10% RH and another Re value at 25 °C and 80% RH, and

ΔRth represents a difference between a Rth value at 25 °C and 10% RH and another Rth value at 25 °C and 80% RH.

9. The cellulose acylate film according to any one of claims 1 to 8, which has an equilibrium moisture content at 25 °C and 80% RH of 3.4% or less.

10. The cellulose acylate film according to any one of claims 1 to 9, which has a water vapor permeability of from 400 $g/m^2 \cdot 24$ hr to 2,300 $g/m^2 \cdot 24$ hr in terms of a film thickness of 80 μm , the water vapor permeability being measured at 60 °C and 95% RH for 24 hours.

11. The cellulose acylate film according to any one of claims 1 to 10, which undergoes change in weight of from 0 to 5% when allowed to stand for 48 hours under a condition of 80 °C and 90% RH.

12. The cellulose acylate film according to any one of claims 1 to 11, which undergoes change in dimension of from -2 to +2% when allowed to stand for 24 hours under each of a condition of 60 °C and 90% RH and another condition of 90 °C and 3% RH.

13. The cellulose acylate film according to any one of claims 1 to 12, which has a glass transition temperature T_g of from 80 to 180 °C.

14. The cellulose acylate film according to any one of claims 1 to 13, which has an elastic modulus of from 1,500 to 5,000 MPa.

15. The cellulose acylate film according to any one of claims 1 to 14, which has a photoelastic coefficient of 50×10^{-13} $cm^2/dyne$ or less.

16. The cellulose acylate film according to any one of claims 1 to 14, which has a haze of from 0.01 to 2%.

17. The cellulose acylate film according to any one of claims 1 to 14, which comprises a silicon dioxide particle having a secondary average particle size of from 0.2 to 1.5 μm .

18. The cellulose acylate film according to any one of claims 1 to 17, wherein $Re_{(630)}$ and $Rth_{(630)}$ at 25 °C and 60% RH satisfy formulae (A) to (C):

$$(A) 46 \leq Re_{(630)} \leq 100$$

$$(B) Rth_{(630)} = a - 5.9Re_{(630)}$$

$$(C) 520 \leq a \leq 600$$

19. The cellulose acylate film according to any one of claims 1 to 18, wherein when Re and Rth measured at 25 °C and 60% RH with respect to different wavelengths satisfy formulae (D) and (E):

$$(D) \quad 0.90 \leq Rth_{(450)}/Rth_{(550)} \leq 1.10 \text{ and } 0.90 \leq Rth_{(650)}/Rth_{(550)} \leq 1.10$$

$$(E) \quad 0.90 \leq Rth_{(450)}/Rth_{(550)} \leq 1.25 \text{ and } 0.90 \leq Rth_{(650)}/Rth_{(550)} \leq 1.10$$

20. A polarizing plate comprising:

a polarizer; and

a protective film comprising a cellulose acylate film according to any one of claims 1 to 19.

21. The polarizing plate according to claim 20, which satisfies at least one of formulae (a) to (d):

$$(a) \quad 40.0 \leq TT \leq 45.0$$

$$(b) \quad 30.0 \leq PT \leq 40.0$$

$$(c) \quad CT \leq 2.0$$

$$(d) \quad 95.0 \leq P$$

wherein TT represents a single plate transmittance at 25°C and 60%RH;

PT represents a parallel transmittance at 25°C and 60%RH;

CT represents a cross transmittance at 25°C and 60%RH; and

P represents a polarization degree at 25°C and 60%RH.

22. The polarizing plate according to claim 20 or 21, which satisfies at least one of formulae (e)

to (g):

$$(e) \quad CT_{(380)} \leq 2.0$$

$$(f) \quad CT_{(410)} \leq 1.0$$

$$(g) \quad CT_{(700)} \leq 0.5$$

wherein $CT(\lambda)$ represents a cross transmittance at the wavelength of λ nm.

23. The polarizing plate according to any one of claims 20 to 22, which satisfies at least one of formulae (j) and (k):

$$(j) \quad -6.0 \leq \Delta CT \leq 6.0$$

$$(k) \quad -10.0 \leq \Delta P \leq 0.0$$

wherein ΔCT and ΔP represents a change in cross transmittance and polarization degree, respectively, in a test that the polarizing plate is allowed to stand at 60°C and 95%RH for 500 hours; and the change means a value calculated by subtracting a measurement value before the test from a measurement value after the test.

24. The polarizing plate according to any one of claims 20 to 23, which comprises at least one of a hard coat layer, an antiglare layer and an antireflective layer.

25. The polarizing plate according to any one of claims 20 to 24, which is packaged in a moisture-proofed bag, wherein the moisture-proofed bag has an internal humidity of from 43 to 70% RH at 25 °C.

26. The polarizing plate according to any one of claims 20 to 24, which is packaged in a

moisture-proofed bag, wherein the moisture-proofed bag has a first humidity within a range of $\pm 15\%$ RH with respect to a second humidity, when the polarizing plate is superposed on a liquid crystal cell at the second humidity.

- 5 27. A liquid crystal display comprising:
 a liquid crystal cell of OCB-mode or VA-mode; and
 at least one of a cellulose acylate film according to any one of claims 1 to 19 and a polarizing plate according to any one of claims 20 to 26.
- 10 28. The liquid crystal display according to claim 27, wherein the liquid crystal cell is a liquid crystal cell of VA-mode, and
 the liquid crystal display contains only one cellulose acylate film according to any one of claims 1 to 19 or only one polarizing plate according to any one of claims 20 to 26.
- 15 29. The liquid crystal display according to claim 27, which comprises a backlight,
 wherein the liquid crystal cell is a liquid crystal cell of VA-mode, and
 the at least one of the cellulose acylate film and the polarizing plate is between the liquid crystal cell and the backlight.